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THE EVOLUTION OF MINEHUNTING IN FRANCE (L'EVOLUTION DE
LA CHASSE AUX MINES EN FRANCE)(U) NAVAL INTELLIGENCE
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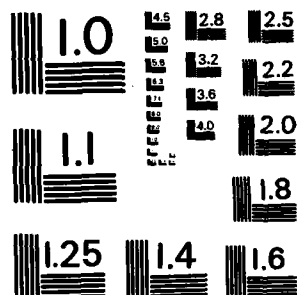
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MICROCOPY RESOLUTION TEST CHART
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THE EVOLUTION OF MINEHUNTING IN FRANCE

[de Drezigue, Cdr; L'Evolution de la Chasse aux Mines en France, Cols Bleus, September 1982, pp. 4-8; French]

On 15 November 1950, off the coast of Korea, a major multinational naval force, primarily composed of American ships, was preparing, against the background of the war which was raging in that area, to execute a landing. This operation, known as the Inchon landing, was not without its vicissitudes. One of these had as a goal the entry into Wonson, the key port on the west coast, protected by fields of ingeniously set magnetic mines. Several weeks were required to sweep them. The lucky find by a commando, set ashore, who discovered in a barn an example of the circuits utilized, left behind by the enemy, greatly facilitated the work.

/4*

The waters were clear and the mines were visible from the helicopters and this caused grumbling by the Command which did not appreciate the fact that, knowing their location, they could not be eliminated.

This vicissitude of the Korean War is, to my knowledge, the origin of the interest which prompted American operational authorities, and later certain European navies, into studies directed at locating mines on the sea bed with the help of an acoustic sensor.

Thus the United States launched during the 1950s a program involving fleet minesweepers provided with, in addition to conventional minesweeping gear, a sonar called the ANUQSf/D, which permitted, under certain conditions, detection on the sea bed of metallic objects. Utilizing this gear proved difficult due to innumerable echos caused by the heterogeneity of the water, the differences in the nature of the sea bed, as well as by all the objects and rocks strewn about.

France acquired a few of these ships starting in 1955 through the Offshore programs,* but it was necessary to wait until the mid-60s before

/5

*Please refer to the article by Captain de Blois, Cols Bleus, No. 1703.

the operational authorities recognized, in view of positive exercise results, the real advantage of this sonar. During the same time, our own engineers, interested in the problem and sustained by the zeal exhibited by the archives officers of the Commission on Practical Studies on Mine Warfare (C.E.P.G.M.) were engaging in promising studies which were leading to an improvement in the system.

During this time, the Korean War having been forgotten, the United States, having known the danger of mine warfare only through operations outside of its territorial waters, did not feel the need to maintain a mine countermeasures force along its coasts. After having somewhat improved its sonar owing to a VDS version (variable-depth sonar), the ANUSQ/14, it abandoned its research in this area.

*Numbers in right margin indicate pagination in original text.

The Necessity of Minehunting in France

And why are the French, Oh! such a small number of experts, interested in minehunting?

The coasts of France are long (3000 km) and access to certain key ports could easily be denied by judiciously placed mines. The continental shelf extends out some 150 km from the coasts, with depths favorable to the use of this type of weapon.

Minesweeping operations pursued for several years following the 1939-1945 war in order to eliminate the danger of some 10,000 mines laid by the Germans or the British have confirmed the effective limits of the minesweeper and the need to deploy them in large numbers. At the beginning of the 1970s there still remained almost 9000 bottom mines in our coastal waters. For the most part, they are no longer a direct threat, but does one ever know?

The frigate LAPLACE indeed sank in 1956 and a number of fishing boats have still been disappearing these last few years for having unfortunately trawled one of these devices.

All of these reasons militate in favor of the Navy's interest in minehunting. At the same time, a new need is arising. With implementation of the Strategic Ocean Force, it had become absolutely necessary to be able to assure transit of our submarines within our coastal waters in complete safety. A surveillance of the seabeds became obligatory, and who better than the minehunter could assure this mission?

Evolution of Minehunting

The guiding thought of this evolution is the following: to have a good knowledge of the seabeds (their nature and dimensions) in such a way as to be able to establish and clean up the areas most favorable to minehunting or those necessary for the operation of our forces, and then to assure surveillance of such zones with a minimum of effort.

To do this, it would be necessary to devise a weapon system which could detect and pinpoint a suspicious object on the seabed, classify it, identify it, then initiate an action with a view to either neutralizing it if it turns out to be a new or unknown device, or destroying it if it should turn out to be a known but dangerous object.

From the Minesweeper to the CIRCE-Class Minehunter

Since the ANUQSI/D sonar of the oceanic minesweepers permits only detection, if was necessary to send for a team of mineclearing divers to handle classification, identification, all together.

It is with the purpose of improving this situation that our engineers viewed their work and culminated their research toward the end of the 1960s.

The DUBM 20 sonar, springing from the imagination of the technicians at GESMA (Groupe d'étude sous-marine de l'Atlantique: Atlantic Underwater Research Group), an organization belonging to DCAN (Direction des Constructions et Armes Navales: Bureau of Naval Construction and Weapons) and the engineers of the CSF company (currently Thomson CSF) was a crucial step in the development of minehunting. Provided with 2 separate sonars, it consolidated the functions of detection and classification. Linked with the self-propelled PAP 104 fish industrialized by ECA (Etablissement Cinematographique des Armées: Armed Forces Cinematographic Establishment) allowing identification at both a distance and in situ by means of a television camera, it became the SKUBERMOR 1 weapon system ("sea sweep" in Breton) very well thought of among the world's navies. Between 1969 and 1972, this system was installed on a series of five minehunters of the CIRCE Class, constructed by the Amiot Shipyard of Cherbourg (CMN = Constructions Mécanique de Normandie - Normandy Mechanical Construction).

The quality of the weapon system was such that by way of example, the hunt record of the CALLIOPE, as of 1 January 1981, was not less than 180 mines, and various other marine objects or obstructions as attested to in the photo above.

During the past 10 years, major missions have been carried out, in particular during the cleanup of the Suez Canal after the Six-Day War, or again within the framework of the development of its autonomous ports of France, like Le Havre - Antifer. For these ports to receive deep-draft vessels it was necessary to clear the approach channels of all obstructions. In other cases it was necessary to dredge in order to deepen the channels: before undertaking these works, the local authorities made an appeal to the Navy and its minehunters in order to have the assurance that there were no remaining mines from the last war which could greatly disrupt operations. This was the case for the works undertaken for the opening of the Gironde by the autonomous port of Bordeaux-Le Verdon.

/6

From the CIRCE Class to the DOMPAIRE Class

During this time our minesweeping forces were aging, and it was evident that the five minehunters were not sufficient for the task. We had the weapon system, it remained to find a platform. The solution was reached by utilizing the best preserved hulls of the fleet minesweepers and refitting them by installing in them the SKUBERMOR weapon system, which was done between 1975 and 1979. We then benefited from an improvement in the weapon system, first on the sonar, the bulkiness of the antennas of which was greatly reduced, and the modes of operation modified, and then the associated localization systems. It appeared progressively evident from the use of the CIRCE minehunters that a good knowledge of the sea beds required a very precise position of the detected echos. This precision, tested at 10 m, is very hard to obtain, numerous sources of error being able to intervene. It is within this perspective that studies carried on with the SINDRA Company since the commissioning of the CIRCE Class have resulted in a plotting board with automatic data processing. This device, known as EVEC (Ensemble de visualisation et enregistrement en chasse aux mines: Minehunting display and recording assembly) was first integrated into the SKUBERMOR system on the CIRCE Class, and afterwards linked with the DUBMA 21A sonar thus giving the SKUBERMOR system of the DOMPAIRE Class its second generation.

Thus the functions of localization, automatic processing and magnetic tape recording of data represent the basic evolution of the capacities of French minehunters between 1974 and 1979.

The former fleet minesweeper NARVIK and the coastal minesweeper BETELGEUSE, experimental ships attached to the Center for Studies, Instruction, and Training in Mine Warfare (C.E.T.I.E.G.M.) were deployed for this purpose.

This organization, founded in 1976 and including under its jurisdiction the Commission on Practical Studies (C.E.P.G.M.), works in very close coordination with the engineers of GESMA. /7

From the DOMPAIRE Class to the ERIDAN Class (Tripartite Minehunter)

Concurrently, operational studies drew around our engineers and seamen various European nations, all interested by the first results of our minehunters, and desirous of participating in a program for the production of a modern minehunter. By the terms of multiple transactions, three countries - France, the Netherlands, and Belgium - signed an accord in 1975 which sanctioned the first association, in the history of the world's navies, of three countries for the construction of a warship.

The "tripartite" agreement currently envisions the start of its realization with the introduction of trials for the first of the French ERIDAN minehunters. The development of this ship in comparison with preceding minehunters lies in several areas which explains, moreover, its rather difficult completion.

This is the first construction in France of a hull of this size in a glass resin composite. The entire ship must resist extremely strong shock stress and this fact led the engineers to allow for a wide range of materials. The requirements for nonmagnetism and for silence gave rise to radically new options such as the installation of turbogas alternators in the superstructures of the ship in order to produce the electricity necessary to power an auxiliary propulsion system of the same type as that on the CIRCE Class, in addition to a bow thruster. /8

The weapon system is still along the lines of the SKUBERMOR, with a third generation. Everyone is inclined to believe that it will be a good selection. Automation has been improved for increased precision and ease of operation. An automatic pilot connected to the EVEC frees the watch officer in the operations center from the necessity of giving orders to navigate the ship during operations with either the PAP or divers.

Finally, the ship is destined to operate in an NBC environment (nuclear, biological and chemical)*, implying that the totality of living and operational

*Translator's Note. Now called CBR environment.

spaces is included in a "citadel", hermetically sealed off from the surrounding atmosphere. Fifteen ships of this class have been planned for

France and the Netherlands, 10 for Belgium. An ambitious program involving 45 ships, it is undoubtedly the completion of a stage in the evolution of minehunting.

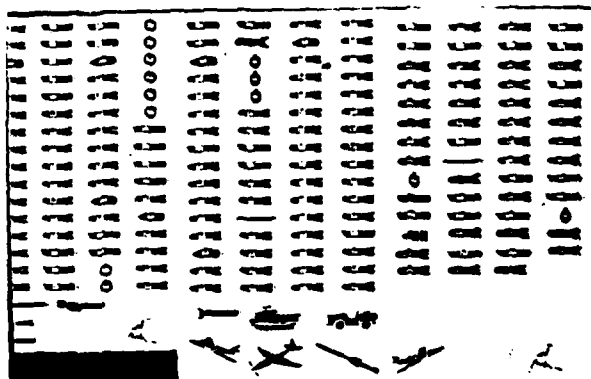
The Future of Minehunting

This is in large measure linked to the development of the threat. Now this is far from going away--in fact, quite the contrary--since after all the progress made in the ingenuity of igniters for conventional mines, the appearance of the mobile mine has greatly expanded its range.*

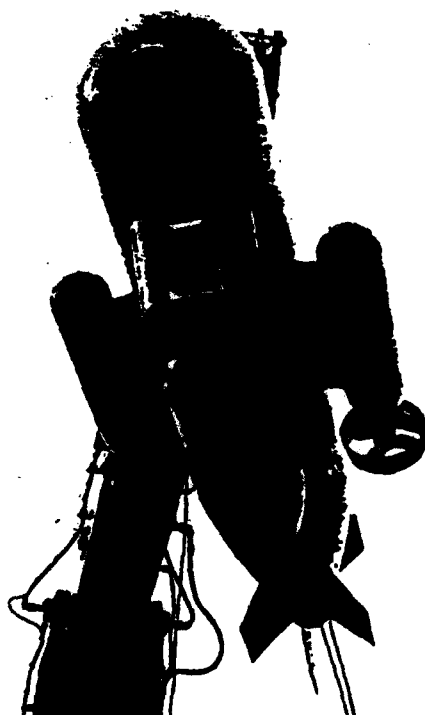
*See article by the same author: "Mine Warfare, A New Dimension", Cols Bleus, 23 January 1982.

The minehunter will become the backbone of the mine countermeasures forces, but by itself it is vulnerable. That is why the first tactic is, and will remain for a rather long time, to utilize conjointly in a single operation the minesweeper and the minehunter, one protecting the other. At the present time, the deployment of our ships responds to this requirement.

Our mine countermeasures forces are going to be, with the arrival of the ERIDAN-Class CMT (Contre-Mine Tripartite: tripartite mine countermeasures), greatly strengthened. Simultaneously, the mine menace will continue to grow. Although we have the impression of having attained a technological plateau in the search for mines by sonar, it is certainly necessary to progress and continue to adapt our equipment and tactics.



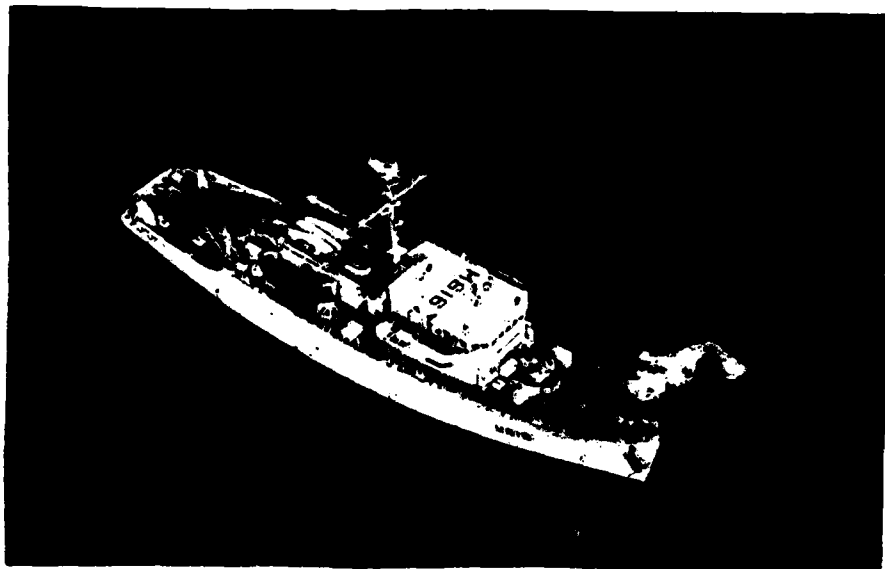
Honors list of the minehunter CALLIOPE to
1 January 1981.



Hoisting the PAP 104 aboard the CIRCE.

EVEC Computer

CLASS OF SHIP IN QUESTION	CIRCE DOMPAIRE (EVEC 10-11)	ERIDAN (EVEC 20)
<u>Operational Functions</u>		
- Data acquisition	X	X
- Output and automatic tracking		X
- Display and preparation of data contracts-types of seabeds zone contours	X	X X
- Calculation of platform and echo positions	X	X
- Objective designation to the sonar	X	X
- Recording and regeneration on magnetic tape	X	X
- Aid to Navigation-Automatic pilot		X
<u>Utilitarian functions</u>		
- Regeneration and publishing of recording	X	X
- Listing of recording on teleprinter		X
- Duplication of programmed or operational cassettes	X	X



The DOMPAIRE



The NARVIK

SKUBERMOR WEAPON SYSTEM

SKUBERMOR	I	II	III
SONAR	DUBM20	DUBM21A	DUBM21B-DUBM41
Data Processing	EVEC 10	EVEC 11	EVEC 20 (ITBC 1A)
Minehunting Propulsion	2 electric motors fitted into the rudder blades	2 variable-pitch propellers + a bow thruster	2 electric motors fitted into the rudder blades + 2 bow thrusters
Navigation	Radio: NAV TORAN SYLEDIS Radar: DANING	Radio: NAV TORAN SYLEDIS Radar: DANING	Radio: NAV TORAN SYLEDIS HI FIX (option) Radar: DANING (with automatic echo output)
Automatic Pilot	No	No	- maintaining course - track keeping - position fix
Operation	PAP 104 + divers (60 m)	PAP 104 + divers (60 m)	PAP 104 + divers (80 m), OD3 mechanical sweep
Additional capacities		Multiseat recompression chamber for the division	- multiseat recompression chamber by division - living quarters (6 bunks) - two-seat chamber
Minehunter Class	CIRCE	DOMPAIRE	ERIDAN



The tripartite minehunter ERIDAN.

Automatic Pilot

In Operations Center Control, three command modes:

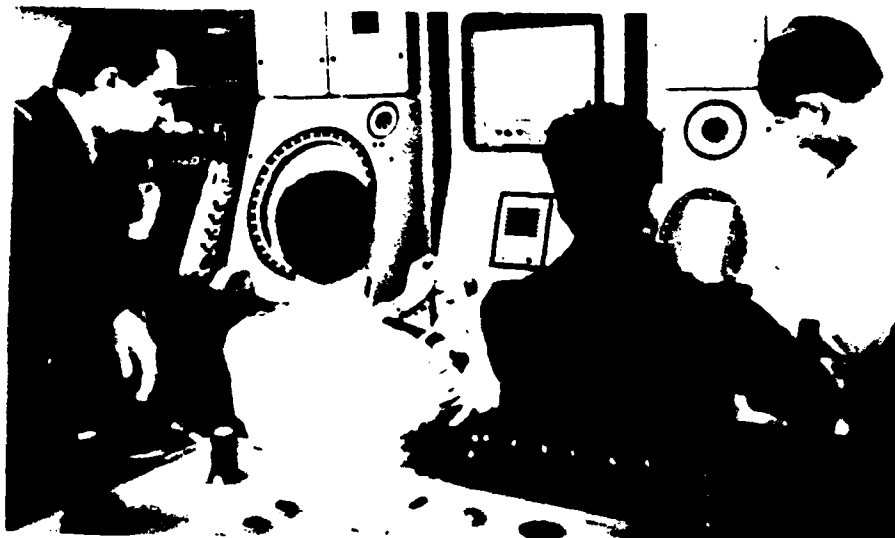
- 1) Track keeping
- 2) Fixed point
- 3) Manual assist - the watch officer has direct control

In bridge control, two command modes:

- 1) Maintain course
- 2) Manual assist; with portable control console

Additionally, automatic pilot provides the watch officer with the following guidance:

- 1) Favorable heading for a fixed point
- 2) Incompatibility of the course ordered with meteorological conditions (wind and current)
- 3) Incompatibility of the course ordered with the required acoustic discretion.



Operations Center on the minehunter ERIDAN, showing the consoles in use with the SKUBERMOR III weapon system. From left to right: radar console, detection console, PAP control console, classification console.



Bridge of the ERIDAN. In the foreground: the chart table. In the background, the navigation console, where the controls for the various propulsion systems, helm, and automatic pilot are concentrated.

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